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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/810,796	03/15/2001	Timothy J. Jegla	018512-005010US	6783
20350	7590	04/20/2005	EXAMINER	
TOWNSEND AND TOWNSEND AND CREW, LLP TWO EMBARCADERO CENTER EIGHTH FLOOR SAN FRANCISCO, CA 94111-3834			BUNNER, BRIDGET E	
			ART UNIT	PAPER NUMBER
			1647	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/810,796	Applicant(s) JEGLA, TIMOTHY J.	
	Examiner Bridget E. Bunner	Art Unit 1647	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 41-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 41-43 and 45-48 is/are rejected.
- 7) ☒ Claim(s) 44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Prosecution Application

The Request for Continued Examination (RCE) filed on 19 January 2005 under 37 CFR 1.114 based on parent Application No. 09/810,796 is acceptable and an RCE has been established. An action on the RCE follows.

Status of Application, Amendments and/or Claims

The amendment of 19 January 2005 has been entered in full. Claims 1-40 are cancelled and claims 41-43 are amended.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 41-48 are under consideration in the instant application.

Withdrawn Objections and/or Rejections

1. The rejections to claims 41-48 under 35 U.S.C. § 112, first paragraph (scope of enablement and written description), as set forth at pg 2-11 of the previous Office Action (20 October 2004) are *withdrawn* in view of the amended claims and Applicant's persuasive arguments (19 January 2005). Please see section on 35 U.S.C. § 112, first paragraph below.

Claim Objections

2. Claim 44 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

3. Claim 48 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated or cultured host cell transfected with a vector, does not reasonably provide enablement for a host cell transfected with a vector. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The Examiner has interpreted the claims as reading on isolated host cells, as well as host cells in the context of a multicellular, transgenic organism and host cells intended for gene therapy. The specification of the instant application teaches that by host cell it is meant "a cell that contains an expression vector and supports the replication or expression of the expression vector. Host cells may be prokaryotic cells such as *E. coli*, or eukaryotic cells such as yeast, insect, amphibian, or mammalian cells such as CHO, Hela and the like, e.g., cultured cells, explants, and cells *in vivo*" (pg 25, lines 18-22). However, there are no methods or working examples disclosed in the instant application whereby a multicellular animal with the incorporated KCNQ5 potassium channel subunit gene of SEQ ID NO: 1, 2, or 3 is demonstrated to express the peptide. The unpredictability of the art is *very high* with regards to making transgenic animals. For example, Wang et al. (Nuc. Acids Res. 27: 4609-4618, 1999; pg 4617) surveyed gene expression in transgenic animals and found in each experimental animal with a single "knock-in" gene, multiple changes in genes and protein products, often many of which were unrelated to the original gene. Likewise, Kaufman et al (Blood 94: 3178-3184, 1999) found transgene expression levels in their transfected animals varied from "full" (9 %) to

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"intermediate" to "none" due to factors such as "vector poisoning" and spontaneous structural rearrangements (pg 3180, col 1, 2nd full paragraph; pg 3182-3183).

The specification also discloses that "the present invention provides the nucleic acids of KCNQ5 for the transfection of cells *in vitro* and *in vivo* and that the "nucleic acid for KCNQ, under the control of a promoter, then expresses a KCNQ5 monomer of the present invention, thereby mitigating the effects of absent, partial inactivation, or abnormal expression of the KCNQ5 gene" (pg 50, lines 30-34 through pg 51, lines 1-3). However, the specification does not teach any methods or working examples that indicate a KCNQ5 potassium channel subunit nucleic acid is introduced and expressed in a cell for therapeutic purposes. The disclosure in the specification (pg 50-55) is merely an invitation to the artisan to use the current invention as a starting point for further experimentation. For example, the specification does not teach what specific type of vector would introduce the KCNQ potassium channel subunit nucleic acid into the cell or in what quantity and duration. Relevant literature teaches that since 1990, about 3500 patients have been treated via gene therapy and although some evidence of gene transfer has been seen, it has generally been inadequate for a meaningful clinical response (Phillips, A., J Pharm Pharmacology 53: 1169-1174, 2001; abstract). Additionally, the major challenge to gene therapy is to deliver DNA to the target tissues and to transport it to the cell nucleus to enable the required protein to be expressed (Phillips, A.; pg 1170, ¶ 1). Phillips also states that the problem with gene therapy is two-fold: 1) a system must be designed to deliver DNA to a specific target and to prevent degradation within the body, and 2) an expression system must be built into the DNA construct to allow the target cell to express the protein at therapeutic levels for the desired length of time (pg 1170, ¶ 1). Therefore, undue experimentation would be required of the skilled

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artisan to introduce and express a KCNQ5 potassium channel subunit nucleic acid into the cell of an organism. Additionally, gene therapy is unpredictable and complex wherein one skilled in the art may not necessarily be able to introduce and express a KCNQ5 nucleic acid in the cell of an organism or be able to produce a KCNQ5 potassium channel subunit protein in that cell.

Due to the large quantity of experimentation necessary to generate a transgenic animal expressing the KCNQ5 potassium channel subunit protein and to introduce and express a KCNQ5 nucleic acid in a cell of an organism for therapy, the lack of direction/guidance presented in the specification regarding how to introduce a KCNQ5 nucleic acid in the cell of an organism to be able produce that KCNQ5, the absence of working examples directed to same, the complex nature of the invention, the state of the prior art which establishes the unpredictability of making transgenic animals and the unpredictability of transferring genes into an organism's cells, and the breadth of the claims which fail to recite any cell type limitations, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope. (Please note that this issue could be overcome by amending the claim to recite, for example, "An isolated host cell...").

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 41-43 and 45-48 are rejected under 35 U.S.C. 102(e) as being anticipated by Jentsch, T. (U.S. Patent 6,649,371; priority to 60/139,891, filed 6/22/1999).

Jentsch teaches an isolated nucleic acid molecule encoding a polypeptide that comprises an amino acid sequence that is 99.6% identical to SEQ ID NO: 5 of the instant application (see ✓ Appendix A attached to the instant Office Action; see nucleotides 1-2691 of SEQ ID NO: 1 of Jentsch and amino acids 1-888 of SEQ ID NO: 5 of the instant application). Jentsch also discloses an isolated nucleic acid molecule encoding a polypeptide that comprises the amino acid sequence of SEQ ID NO: 4 of the instant application (see Appendix B attached to the instant Office Action; see nucleotides 1-2691 of SEQ ID NO: 1 of Jentsch and amino acids 1-897 of SEQ ID NO: 4 of the instant application). Furthermore, Jentsch discloses that the polypeptide encoded by the nucleic acid comprises an alpha subunit of a homomeric potassium channel and an alpha subunit of a heteromeric potassium channel (col 1, lines 54-58; col 4, lines 43-62). Jentsch also teaches an expression vector comprising the nucleic acid molecule encoding the polypeptide and a host cell transfected with the vector (col 13 through col 14, lines 1-16).

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Conclusion

No claims are allowable.

The art made of record and not relied upon is considered pertinent to applicant's disclosure:

Hu et al. U.S. Patent 6,767,736 (the nucleic acid sequences of SEQ ID NO: 1, 3 of Hu et al. are 97.4% similar to SEQ ID NO: 2 of the instant application; the nucleic acid sequences of SEQ ID NO: 1, 3 of Hu et al. are 99.8% similar to SEQ ID NO: 3 of the instant application; the nucleic acid sequence of SEQ ID NO: 3 of Hu et al. is 94.1% similar to SEQ ID NO: 1 of the instant application)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bridget E. Bunner whose telephone number is (571) 272-0881. The examiner can normally be reached on 8:30-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brenda Brumback can be reached on (571) 272-0961. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BEB
Art Unit 1647
18 April 2005

Bridget E. Bunner
patent examiner

Db 2805 AGCTGCTCATCTCACTGAAA 2828

RESULT 3
US-09-590-304-1
Sequence 1, Application US/09590304

Patent No. 6649371
GENERAL INFORMATION:
APPLICANT: JENTSCH, Thomas
TITLE OF INVENTION: NOVEL POTASSIUM CHANNELS AND GENES ENCODING THESE POTASSIUM CHA
FILE REFERENCE: 2815-0136P
CURRENT APPLICATION NUMBER: US/09/590,304
CURRENT FILING DATE: 2000-06-09
NUMBER OF SEQ ID NOS: 10
SOFTWARE: PatentIn version 3.0
SEQ ID NO 1
LENGTH: 3137
TYPE: DNA
ORGANISM: Homo sapiens
FEATURE:
NAME/KEY: CDS
LOCATION: (1)..(2691)
US-09-590-304-1

Alignment Scores:
Pred. No.: 0
Score: 4527.50
Percent Similarity: 99.00%
Best Local Similarity: 98.89%
Query Match: 99.57%
DB: 4
Length: 3137
Matches: 887
Conservative: 1
Mismatch: 0
Indels: 9
Gaps: 1

US-09-810-796-5 (1-888) x US-09-590-304-1 (1-3137)

QY 1 MetIyAspValGlnSerGlyArgGlyArgValLeuLeuAnsSerAlaAlaArgGly 20
DB 1 ATGAAGATGTGAGTCGGGCCGGGCAAGGTGCTGTAACTCGGCAGCCGCAAGGCG 60
QY 21 AspGlyLeuLeuLeuLeuGlyThrArgAlaAlaThrLeuGlyGlyGlyGlyLeu 40
DB 61 GACGGCTGTACTGCTGGGCAACCGCGGCCACGCTGGTGGCGCGGGTGGCTG 120
QY 41 ArgGlnSerArgArgGlyLysGlnGlyAlaArgMetSerLeuLeuGlyLysProLeuSer 60
Leu 740
JCCTT 2384

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US-09-810-796-5.

QY	772	LeuSerValCysProMetValProlysaAspLeuGlyLysSerLeuSerValGlnAsnLeu	791
DB	2341	TTGCTGTCTGTCCATGGTCCGAGGACTTGGGCAATCTTGTCTGTGCAAACTTG	2400
QY	792	IleArgSerThrGluGluLeuAsnIleGlnLeuSerGlySerGlySerArg	811
DB	2401	ATCAGGTCGACCGAGAACTGATATACACTTTCAGGAGTGAAGTCAAGTGCTCCAGA	2460
QY	812	GlySerGlnAspPheTyrProLysTyrArgGluSerLysLeuPheIleThrAspGlu	831
DB	2461	GGCAGCCAAAGTTTATACCCCAATGAGGGATCCAAATTGTTATACAGTAAAGAG	2520
QY	832	ValGlyProGluGluThrGluThrAspThrPheAspAlaAspGlnProAlaArgGlu	851
DB	2521	GTGGTCCCGAAGACAGAGACAGACACTTTGATGCCGACCGACGCTGCCAGGAA	2580
QY	852	AlaAlaPheAlaSerAspSerLeuArgThrGlyArgSerArgSerGlnSerIleCys	871
DB	2581	GCTGCCCTTGCATCAGACTCTCTAAGACTGGAAGTCAAGATCATCTCAGAGCAATTGT	2640
QY	872	LysAlaGlyGluSerThrAspAlaLeuSerLeuProHleValLysLeuLys	888
DB	2641	AAGCAGAGAGAAAGTACAGATGCCCTTGCTCAGTCAACTGAA	2691

Appendix B (1)

DB: US-09-810-796-4 (1-897) x US-09-590-304-1 (1-3137)

QY 1 MetLysAspValGlnserGlyArgGlyArgValIleuLeuAsnSerAlaAlaAlaArgGly 20

1 ATCAAGAGATGTGAGCTCGGCGCGGCGAGGGGCTCTCAATCGGCGACGCCCGAGGGC 60

DB 1 AspGlyLeuLeuLeuLeuGlyThrArgAlaAlaThrLeuGlyGlyGlyLeu 40

QY 21 AspGlyLeuLeuLeuLeuGlyThrArgAlaAlaThrLeuGlyGlyGlyLeu 40

Db 61 GAGGCGCTGCTACTGCTGGGCAACCGCGGCGCAAGCTGGGTGGCGGGGCGGCTG 120
Qy 41 ArgGluSerArgArgGlyGlyGlnGlyAlaArgMetSerLeuLeuGlyProLeuSer 60
Db 121 AGGAGAGAGCGCGGGGAGACAGAGGGGCGCGATGAGCTGCTGGGAGAACCCCTCTCT 180
Qy 61 TyrThrSerSerGlnSerCysArgArgAsnValIleYrArgArgValGlnAsnTyrLeu 80
Db 181 TACACGAGTACGAGAGCTGGCGGCGCAACGTCAGTACCGCGGGTGCACAACTACTG 240
Qy 81 TyrAsnValIleuGlnArgProArgGlyTyrAlaPheIleTyrHISAlaPheValPheLeu 100
Db 241 TACACGCTGCTGGAGAGACCCCGCGGCTGGGCTTCATCTACACGCTTTCCTTCTC 300
Qy 101 LeuValPheGlyCysLeuIleLeuSerValPheSerThrIleProGlnHISThrLeu 120
Db 301 CTCTCTTGGGTCTGATTTTGTCAAGTGTTCATCTACCATCTCCGAGCAACAATG 360
Qy 121 AlasSerSerCysLeuLeuIleLeuGlnPheValMetIleValValPheGlyLeuGlnPhe 140
Db 361 GCTCAGAGTGGCTCTTGATCTGAGTTCGATGATGTCGCTTGTGGTGGAGTTC 420
Qy 141 IleIleArgIleTyrSerAlaGlyCysCysArgTyrArgGlyTyrGlnGlyArgLeu 160
Db 421 ATCATTCGATCTGCTGCTGGGCTGGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTG 480
Qy 161 ArgPheAlaArgIleProPheCysValIleAspThrIleValLeuIleAlaSerIleAla 180
Db 481 AGGTTTCTCGAAAGCCCTTCTGATCTGAGTTCGATGATGTCGCTTGTGGTGGAGTTC 540
Qy 181 ValValSerAlaIleYrThrGlnGlyAsnIlePheAlaThrSerAlaLeuArgSerLeuArg 200
Db 541 GTGTCTTCTGAAAGAACCTCGAGTAAATTTTGCAGTCTGCACTCAGAGCTCCGT 600
Qy 201 PheLeuGlnIleLeuArgMetValArgMetAspArgArgGlyGlyThrTyrLeuLeu 220
Db 601 TTCTTACAGATCCCTCCGATGCTGCGATGAGCCGAGGGAGGCACTGAGAAATTACTG 660
Qy 221 GlySerValValIleYrAlaHISerLeuGlyLeuIleThrAlaTyrTyrIleGlyPheLeu 240
Db 661 GGTTCACTGGTTTATGCTCAGACAGAGAAATTAATCAAGCTGTGTCATGAGATTTTGG 720
Qy 241 ValLeuIlePheSerSerPheLeuValTyrLeuValGlnAspAlaAsnIleGlnPhe 260
Db 721 GTTCTTATTTTGTCTTCTTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT 780
Qy 261 SerThrTyrAlaAspAlaLeuTyrTyrGlyThrIleThrLeuThrThrIleGlyTyrGly 280
Db 781 TCTACATATGAGATGCTCTGCTGGGAGCAATTAATTAATTAATTAATTAATTAATTA 840
Qy 281 AspIleThrProLeuThrTyrPheGlyArgLeuLeuSerAlaGlyPheAlaLeuLeuGly 300
Db 841 GACAAATCTCCCTAACTGGCTGGAGAAATGCTTCTGCAAGCTTGGCACTCTTGGC 900
Qy 301 IleSerPhePheAlaLeuProAlaGlyIleLeuGlySerGlyPheAlaLeuLeuValGln 320
Db 901 ATTCTTCTTGTGACTTCTGCGCGGCAATCTTGGCTGAGGTTCATTAATTAATTAAT 960
Qy 321 GlnGlnHISArgGlnIleYrHISArgGlyLeuArgArgAsnProAlaAsnIleGln 340
Db 961 GAACAAACACCGCGAGAAACCTTGAAGAAAGAGAAACCAAGCTGCAACTCATTCAG 1020
Qy 341 CysValTyrArgSerTyrAlaAlaAspGlnIleSerValSerIleAlaThrTyrPro 360
Db 1021 TGTGTGGGTGATTCAGCAGCTGATGAGAAATCTGTTCTCATTCAGCACTGAGAACCA 1080
Qy 361 HisLeuValAlaLeuHISThrCysSerProThrIleYrGlnGlnGlyAlaSerSer 380
Db 1081 CACTGAAGGCTTGGCACTGCAAGCTTACCAAGAAAGAAAGAGAGAGCACTCAAGC 1140
Qy 381 SerGlnIleLeuSerPheIleGlnArgValIleArgMetAlaSerProArgGlyGlnSerIle 400

Db 1141 AGTCAGAGCTAGTATTTAAGAGCGAGTCCGATGCTAGCCCAAGGGCGAGATATT 1200
Qy 401 LysSerArgGlnAlaSerValGlyAspArgArgSerProSerThrAspIleThrAlaGln 420
Db 1201 AAGAGCCGACAACTCAGTAGAGTGAAGAGGTCCCAAGCAACGACATCAAGCGGAG 1260
Qy 421 GlySerProThrIleValGlnIleSerThrIlePheAsnAspArgThrArgPheArgPro 440
Db 1261 GGCAGTCCCAACCAAGTGCAGAGAGCTGAGCTTCAACACGACCGCTTCGGGCC 1320
Qy 441 SerLeuArgLeuIleSerSerGlnProLysProValIleAspAlaAspThrAlaLeuGly 460
Db 1321 TCCGTGGCTCABAAGTCTCAGCCAAACAGTATGATGCTGACAGCCCTTGGC 1380
Qy 461 ThrAspAspValIleYrAspGlnIleGlyCysGlnCysAspValSerValGlnAspLeuThr 480
Db 1381 ACTGATGAT 1440
Qy 481 ProProLeuYrThrValIleArgAlaIleArgIleMetLysPheHISValAlaLysArg 500
Db 1441 CACCACTTAACTGCTCATTCAGCTATGAGATTTAGAAATTTCTATGTTGCAAAACG 1500
Qy 501 LysPheLeuGlnThrLeuArgProTyrAspValIleAspValIleGlnIleYrSerAla 520
Db 1501 AAGTTTAAAGAAACATTAGCTCCATATGATTAAGATGATGATTAACATATTCTGCT 1560
Qy 521 GlyHISLeuAspMetLeuCysArgIleYrSerLeuGlnThrArgValAspGlnIleLeu 540
Db 1561 GGTCATCTGCACTGTTGTGTATGAAATTAAGCTTCAACAGCTGTGATCAATCTT 1620
Qy 541 GlyIleGlnIleThrSerAspIleYrSerArgGlnIleYrIleThrAlaGlnIleGln 560
Db 1621 GAAAGAGGCAATTCATATGATTAAGAGAGCCGAGAGAAATTAACAGCAAGCACTAG 1680
Qy 561 ThrThrAspAspLeuSerMetLeuGlyArgValValIleYrGlnIleGlnIle 580
Db 1681 ACCAGAGACATCTCAGTATGCTCGGTGGGTGTCAGGTTGAAAACAGGTCACTGC 1740
Qy 581 IleGlnSerIleYrLeuAspCysLeuLeuAspIleTyrGlnIleValIleuArgIleYrSer 600
Db 1741 ATAGAAATCCAGCTGAGCTGCTCCTAGATCTTACAAAGCTCTTGGAGAAAGGCTCT 1800
Qy 601 AlasSerAlaLeuAlaLeuAlaSerPheGlnIleProProPheGlnCysGlnIleThrSer 620
Db 1801 GCTCAGCCCTCGCTTGTGCTTCACTTCCAGATCCCACTTTGAATGAGACATCT 1860
Qy 621 AspTyrGlnSerProValAspSerIleAspLeuSerIleYrSerAlaGlnAsnSerGlyCys 640
Db 1861 GACTATCAAGCCCTGAGTACCAAGATCTTCCGGGTTCCGCACAAAACAGTGGCTGC 1920
Qy 641 LeuSerArgSerThrSerAlaAsnIleSerArgIleGlnIlePheIleLeuThrProAsn 660
Db 1921 TTATCCAGATCACTAGTGCACATCTCAGAGGCTGAGTTCATTCAGCCCAAT 1980
Qy 661 GluPheSerAlaGlnThrPheTyrAlaLeuSerProThrMetHISSerGlnAlaThrGln 680
Db 1981 GAGTTCAGTCCAGACTTTCAGCGCTTACGCTTACCTATGACAGTCAAGCAACAG 2040
Qy 681 ValProIleSerGlnSerAspGlySerAlaValAlaAlaThrAsnThrIleAlaAsnGln 700
Db 2041 GTGCCAATATGTAAGAGATGCTCAGAGTGGAGCCCAACCACTATTCAGCAACAA 2100
Qy 701 IleAsnThrAlaProLysProAlaAlaProThrThrLeuGlnIleProProLeuPro 720
Db 2101 ATAAATACGACCCAGAGCAGAGCCCAACCACTTACAGATCCCACTCTCTCCCA 2160
Qy 721 AlaIleYrHISLeuProArgProGlnIleThrLeuHISProAsnProAlaGlyLeuGlnIle 740
Db 2161 GCATCAAGATCTGGCCAGGCAAGAACTCTGCACTTACCTGAGGCTTACAGGAA 2220
Qy 741 SerIleSerAspValIleThrCysLeuValAlaSerIleGlnAsnValGlnValAlaGln 760
Db 2221 AGCATTTCTGACCTGACCAACCTGCTGTGCTTCCAGAGAAATGTTCAAGTTGACAG 2280

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QY	761	Ser	Asn	Leu	Thr	Val	Asp	Arg	Ser	Met	Arg	Leu	Ser	Phe	Asp	Met	Gly	Gly	Thr	Leu	780
Db	2281	TCA	AAT	CTC	AC	CA	AG	GA	CC	GT	TT	CT	AT	GA	GG	AA	AA	AG	CT	TGA	2340
QY	781	Leu	Ser	Val	Cys	Pro	Met	Val	Pro	Leu	Asp	Leu	Gly	Leu	Ser	Val	Gln	Asn	Leu	800	
Db	2341	TTG	CTG	CTG	CTG	CC	AT	GT	GT	CC	AG	GA	CT	GG	CA	AA	CT	TT	GT	CT	2400
QY	801	Ile	Arg	Ser	Thr	Glu	Glu	Ileu	Asn	Ile	Gln	Leu	Ser	Gly	Ser	Glu	Ser	Gly	Ser	Arg	820
Db	2401	ATC	AGT	CGA	CCG	AG	AA	CT	GA	AT	AT	CA	CT	TT	CA	GG	AG	GT	CA	AG	2460
QY	821	Gly	Ser	Gln	Asp	Phe	Tyr	Pro	Leu	Arg	Glu	Ser	Leu	Phe	Ile	Thr	Asp	Glu	Glu	840	
Db	2461	GGC	AGC	CA	AG	AT	TTT	TAC	CCC	CA	AT	GA	GG	GA	AT	CC	AA	TT	GT	TA	2520
QY	841	Val	Gly	Pro	Glu	Glu	Thr	Arg	Thr	Asp	Thr	Phe	Asp	Ala	Ala	Pro	Gln	Pro	Ala	Arg	860
Db	2521	GTG	GT	CCC	CA	AG	AG	CA	AG	CA	CA	CT	TT	GA	TG	CC	CA	CC	CA	GG	2580
QY	861	Ala	Ile	Phe	Asn	Asp	Ser	Leu	Arg	Thr	Gly	Arg	Ser	Arg	Ser	Gln	Ser	Ile	Cys	880	
Db	2581	GCT	GC	CTT	GC	AT	CA	AG	CT	CT	CA	AG	CA	CT	CA	AG	CA	CT	CA	AG	2640
QY	881	Leu	Ala	Gly	Glu	Ser	Thr	Asp	Ala	Leu	Ser	Leu	Pro	Ile	Val	Ile	Leu	Ile	Leu	897	
Db	2641	AAG	CA	AG	AA	AG	TA	CA	AG	TG	CC	CT	CA	AG	TT	GC	CT	CA	AG	TT	2691